

(35) $x^3 - 8 = 0$

$(x-2)(x^2+2x+4)=0$

$x-2=0 \quad a=1 \quad b=2 \quad c=4$

$x=2 \quad x = \frac{-2 \pm \sqrt{(2)^2 - 4(1)(4)}}{2(1)}$

$x = \frac{-2 \pm \sqrt{4-16}}{2}$

$x = \frac{-2 \pm \sqrt{-12}}{2} = \frac{-2 \pm 2i\sqrt{3}}{2}$

$x = -1 \pm i\sqrt{3}$

$x = \{2, -1+i\sqrt{3}, -1-i\sqrt{3}\}$

(36) $x^3 - 27 = 0$

$(x-3)(x^2+3x+9)=0$

$x-3=0 \quad a=1 \quad b=3 \quad c=9$

$x=3 \quad x = \frac{-3 \pm \sqrt{9-4(1)(9)}}{2}$

$x = \frac{-3 \pm \sqrt{-27}}{2}$

$x = \frac{-3 \pm 3i\sqrt{3}}{2}$

$\{3, \frac{-3 \pm 3i\sqrt{3}}{2}\}$

(38) $x^3 + 64 = 0$

$(x+4)(x^2-4x+16)=0$

$x+4=0 \quad a=1 \quad b=-4 \quad c=16$

$x=-4 \quad x = \frac{4 \pm \sqrt{16-4(1)(16)}}{2(1)}$

$x = \frac{4 \pm \sqrt{-48}}{2}$

$x = \frac{-4 \pm 4i\sqrt{3}}{2}$

$x = -2 \pm 2i\sqrt{3}$
 $\{-4, -2+2i\sqrt{3}, -2-2i\sqrt{3}\}$

(57) $s = \frac{1}{2}gt^2$ for t

$2s = gt^2$

$\frac{2s}{g} = t^2$

$\pm \sqrt{\frac{2s}{g}} = t$

$t = \pm \frac{\sqrt{2s}}{\sqrt{g}} \cdot \frac{\sqrt{g}}{\sqrt{g}} = \pm \frac{\sqrt{2gs}}{g}$
 $g \neq 0$

(58) $A = \pi r^2$ for r

$\frac{A}{\pi} = r^2$

$r = \pm \frac{\sqrt{A}}{\sqrt{\pi}} \cdot \frac{\sqrt{\pi}}{\sqrt{\pi}} = \pm \frac{\sqrt{A\pi}}{\pi}$

(60) $s = s_0 + gt^2 + k$ for t

$s - s_0 - k = gt^2$

$t^2 = \frac{s - s_0 - k}{g}$

$t = \pm \frac{\sqrt{s - s_0 - k}}{\sqrt{g}} \cdot \frac{\sqrt{g}}{\sqrt{g}}$

$t = \pm \frac{\sqrt{s - s_0 - k}}{g} \quad g \neq 0$

(59) $F = \frac{K M v^2}{r}$ for v

$F r = K M v^2$

$\frac{F r}{K M} = v^2$

$v = \pm \sqrt{\frac{F r}{K M}}$

$v = \pm \frac{\sqrt{F r}}{\sqrt{K M}} \cdot \frac{\sqrt{K M}}{\sqrt{K M}}$

$v = \pm \frac{\sqrt{F r K M}}{K M}$

$K \neq 0 \quad m \neq 0$

(62) $s = 2\pi r h + 2\pi r^2$ for r

$0 = 2\pi r^2 + 2\pi r h - s$

$a=2\pi \quad b=2\pi h \quad c=-s$

$r = \frac{-2\pi h \pm \sqrt{(2\pi h)^2 - 4(2\pi)(-s)}}{2(2\pi)}$

$r = \frac{-2\pi h \pm \sqrt{4\pi^2 h^2 + 8\pi s}}{4\pi}$

$r = \frac{-2\pi h \pm \sqrt{4(\pi^2 h^2 + 2\pi s)}}{4\pi}$

$r = \frac{-2\pi h \pm 2\sqrt{\pi^2 h^2 + 2\pi s}}{2\pi}$

$r = \frac{-\pi h \pm \sqrt{\pi^2 h^2 + 2\pi s}}{\pi}$

(66) $x^2 - 5x + 4 = 0$

$a=1$ $b=-5$ $c=4$

$b^2 - 4ac$
 $(-5)^2 - 4(1)(4)$

$25 - 16$

9

2 Real Rational Sol.

(68) $8y^2 = 14y - 3$

$8y^2 - 14y + 3 = 0$

$(-14)^2 - 4(8)(3)$

$196 - 96$

100

2 Real Rational

(70) $2r^2 - 4r + 1 = 0$

$(-4)^2 - 4(2)(1)$

$16 - 8$

8

2 Real Irrational

(72) $3z^2 = 4z - 5$

$3z^2 - 4z + 5 = 0$

$(-4)^2 - 4(3)(5)$

$16 - 60$

-44

2 complex solutions

(77) 4, 5

$(x-4)(x-5) = 0$

$x^2 - 9x + 20 = 0$

$a=1$ $b=-9$ $c=20$

(78) -3, 2

$(x+3)(x-2) = 0$

$x^2 + x - 6 = 0$

$a=1$ $b=1$ $c=-6$

Extra problems

(1) $25m^2 - 10m + k = 0$

$b^2 - 4ac = 0$

$(10)^2 - 4(25)(k) = 0$

$100 - 100k = 0$

$-100k = -100$

$k = 1$

(2) $y^2 + 11y + k = 0$

$b^2 - 4ac = 0$

$(11)^2 - 4(1)(k) = 0$

$121 - 4k = 0$

$-4k = -121$

$k = \frac{121}{4}$

(79) $1 + \sqrt{2}, 1 - \sqrt{2}$

$[x - (1 + \sqrt{2})][x - (1 - \sqrt{2})]$

$(x - 1 - \sqrt{2})(x - 1 + \sqrt{2})$

$x^2 - x + x\sqrt{2} - x + 1 - \sqrt{2} - x\sqrt{2} + \sqrt{2} - 2$

$x^2 - 2x - 1 = 0$

$a=1$ $b=-2$ $c=-1$

(4) $ky^2 + 2(k+4)y + 25 = 0$

$a=k$ $b=2(k+4)$ $c=25$

$b^2 - 4ac = 0$

$[2(k+4)]^2 - 4(k)(25) = 0$

$(2k+8)^2 - 100k = 0$

$4k^2 + 32k + 64 - 100k = 0$

$4k^2 - 68k + 64 = 0$

$4(k^2 - 17k + 16) = 0$

$4(k - 16)(k - 1) = 0$

$k - 16 = 0$ $k - 1 = 0$

$k = 16$ $k = 1$

$\{1, 16\}$

(3) $Kr^2 + (2K+6)r + 16 = 0$

$b^2 - 4ac = 0$

$(2K+6)^2 - 4(K)(16) = 0$

$4K^2 + 24K + 36 - 64K = 0$

$4K^2 - 40K + 36 = 0$

$4(K^2 - 10K + 9) = 0$

$4(K - 9)(K - 1) = 0$

$K = 9$ $K = 1$

$\{9, 1\}$